



## Pb-Free/RoHS/Green Information

### Environmental Policy:

Exar Corporation is committed to protecting the environment and individual health and safety. We shall comply with all environmental regulations, health and safety laws applicable to our business. We employ continual efforts to minimize the environmental impact from our products.

### RoHS Requirement:

RoHS is a European Union (EU) directive for the restriction of certain hazardous materials which are harmful to the health and environment. These substances identified by RoHS directive include:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr<sup>+6</sup>)
- Polybrominated biphenyl (PBB)
- Polybrominated diphenyl ether (PBDE)

### RoHS/Green Limit Requirement:

Limit restrictions for these harmful materials are as follows in 2 different levels:

1. RoHS compliant
2. Green compliant
- 3.

**Table 1: Hazardous Materials Limitation**

	Level	Restricted Elements	Symbol	Max. Limit	
1	RoHS Compliant	Lead Mercury Cadmium Chromium Polybrominated Biphenyls Polybrominated Diphenyl Ethers	Pb Hg Cd Cr <sup>+6</sup> PBB PBDE	1000ppm 1000ppm 100ppm 1000ppm 1000ppm 1000ppm	
2	Green	<u>MEETS</u> RoHS requirements <u>PLUS</u> the following restrictions:  Bromine Chlorine  Antimony	  Br Cl Sb (Sb <sub>2</sub> O <sub>3</sub> )	  900ppm 900ppm 900ppm	  1500ppm total
<b>Note:</b> Green by definition is halogen-free					

## **Product Types from EXAR:**

1. All EXAR products are RoHS-5 compliant regardless of lead finish, i.e. free from mercury, cadmium, hexavalent chromium, PBB, and PBDE. Products with “- L” and “- F” suffixes are RoHS-6 compliant.
  
2. Restricted substances for China RoHS are the same as EU RoHS and EXAR is committed to full compliance with China’s Management Methods on the Control of Pollution from Electronic Information Products.
  
3. EXAR has 3 different environmental “level” products identified by their part numbers with:
  - 2.1 NO suffix
  - 2.2 “- L” suffix
  - 2.3 “- F” suffix

Note: A few custom products carry “-G” suffix which has the same definition as “- F”

**Table 2: Product Part Numbering Differentiation**

<b>Different Environmental Levels of Products</b>			
<b>Product Suffix</b>	<b>Level</b>	<b>Lead Finish/Ball Composition</b>	<b>Comment</b>
<b>None</b>	contains Pb	Sn/Pb	-
<b>- L</b>	RoHS Compliant	<u>Lead frame:</u> 100% matte Sn <u>BGA:</u> SAC (Sn/Ag/Cu) balls	Flip-chip bumps containing Pb is currently exempted by EU from Pb-free compliance
<b>- F</b>	Green		completely Pb-free and halogen-free
<b>Symbol:</b>	Sn(tin), Pb(lead), Ag(silver), Cu(copper), Ni(nickel), Pd(palladium), Au(gold)		
<b>Notes:</b>			
<b>1</b>	Small % of Power products use Ni/Pd/Au lead finish instead of 100% matte Sn in Sc70/TSOT/QFN packages		
<b>2</b>	If datasheet does not specify product suffix type, please consult with EXAR local Sales for “- L” or “- F” availability.		
<b>3</b>	Products with <b>prefix</b> “SP/SPX/LP” using DFN/QFN package family are already green even though their product number <b>suffix</b> ends with “- L”. For these products, the suffix has not been changed to “- F” to avoid extra paperwork for existing customers. However, the EXAR goal is to migrate to “-F” in the future for standardization.		

4. Pb-free products are also compatible with standard Sn/Pb solder board assembly.
5. EXAR's goal is to migrate away from Sn/Pb solder but will support customers needs to the best we can. Please contact your local EXAR sales representative or distribution partner for specific or further information.
6. EXAR is in the process of migrating to green according to industry demand.

#### **Frequently Asked Questions:**

1. ***What is the lead finish for the product I order?***

Please refer to Table 2 for the information

2. ***Are Pb-free products from EXAR RoHS compliant?***

Yes

3. ***Do EXAR products include annealing for matte tin plating lead finish?***

Yes. Annealing is done @ 150°C for 1 hour post plating to mitigate tin whisker growth

4. ***How long has EXAR had Pb-free and green programs in place?***

Exar initiated these programs in 2001.

5. ***How long has EXAR been shipping Pb-free/green products to customers?***

Exar began shipping these products to customers in 2003.

6. ***Does Exar participate in industry consortiums that deal with Pb-free/green initiatives?***

Exar is committed to the advancement of the semiconductor industry with participation in many industry consortiums. Exar closely works with its assembly subcontractors to maintain the required level of certification for continual business.

7. ***Is there any marking differentiation for the different environmental levels of products?***

Yes. Please refer to datasheets for marking content or contact EXAR local Sales for the detailed marking spec per product.

8. ***Why is there Legislation Control on Halogens?***

Halogens are highly reactive oxidizing agents. They can be harmful or lethal to biological organisms in sufficient quantities.

Halogens are fluorine (F), chlorine (Cl), bromine (Br), iodine (I) and astatine (At). Some halogens were widely used as flame retardants. **Brominated** flame retardants are often most effective when cost/performance are considered, and have been widely used in semiconductor materials.

9. ***Are there any functional or electrical differences among products with no suffix, -L suffix and -F suffix?***

There is no difference